AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

Jan 10, 2025
Adopted by the Japan Transport Safety Board
Chairperson TAKEDA Nobuo
Member SHIMAMURA Atsushi
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Company	Privately owned
Type, Registration Mark	Christen Industries A-1, JA4083
Incident Class	Dragging during landing of a wing tip or any other part of the aircraft other than the landing gears Article 166-4, Item (iii), of the Regulation for Enforcement of the Civil Aeronautics Act of Japan.
Date and Time of the Occurrence	At about 14:10 Japan Standard Time (JST: UTC+9 hours), October 7, 2023
Site of the Incident	Hida Airpark (Operation Site), Takayama City, Gifu Prefecture (36° 10' 46" N, 137° 18' 48" E)

1. PROCESS AND PROGRESS OF THE SERIOUS INCIDENT INVESTIGATION

Summary of the Serious Incident	On Saturday, October 7, 2023, the right wing tip of the aircraft came into contact with the runway surface during ground roll after landing at Hida Airpark, Takayama City, Gifu Prefecture, and when the aircraft came to a stop, resulting in a nose over with the nose part coming into contact with the runway surface. The aircraft was slightly damaged, but the pilot did not sustain any injury.
Outline of the Serious Incident Investigation	The Japan Transport Safety Board (JTSB) designated an investigator-in charge and an investigator on October 7, 2023, to investigate this serious incident. Comments on the draft Final Report were invited from the parties relevant to the cause of the serious incident and the Relevant State.

2. FACTUAL INFORMATION

Aircraft Information

Aircraft type:	Christen Industries A-1
Serial number: 1065	Date of manufacture: November 29, 1988
Airworthiness certificate: No. Tou-2022-315	Validity: November 16, 2023

Personnel Information

Pilot: Age 71

Private pilot certificate (Airplane)	April 22, 1983
Pilot competency assessment	Expiry of practicable period for flight: June 20, 2024
Rating for single-engine (land)	April 22, 1983
Class 2 aviation medical certificate	Validity: April 11, 2024
Total flight time	734 hours 52 minutes
Flight time in the last 30 days	0 hour 40 minutes
Total flight time on the type of aircraft	664 hours 14 minutes

Flight time in the last 30 days	0 hour 40 minutes

Meteorological Information

The wind conditions, which the pilot confirmed from the air by looking at the windsock (wind direction indicator) installed at Hida Airpark (hereinafter referred to as "Operation Site") from the air before the landing where the incident occurred, were blowing from north or north-northwest at a velocity of about 5 m/s (about 10 kt).

In addition, according to the Piste (training command post) which a glider club established at the Operation Site, before the landing of the aircraft, the wind was blowing from the north at a speed of 7 to 8 kt.

However, according to the wind direction and velocity observation records (10-minute average wind conditions) of the anemometer located near the administration office of the Operation Site, the wind at 14:10 was blowing from the north at a speed of 8 m/s (about 16 kt).

Permission under Civil Aeronautics Act

The proviso of article 79 of the Civil Aeronautics Act: Approved

Event Occurred and Relevant Information

(1) History of the flight

The aircraft took off from the Operation Site to tow a glider with only the pilot on board and returned to the Operation Site after the aerotow release of the glider. The pilot checked the windsock at the Operation Site from the air and judged the wind to be blowing from north or north-northwest at a velocity of about 5 m/s. At this time, a preceding aircraft was approaching Runway 10, and the pilot thought that the landing from either direction (Runway 10/28) would expose the aircraft to crosswinds from abeam the aircraft and decided to follow the preceding aircraft onto Runway 10.

The pilot made an approach using flaps at 30°, maintaining a speed of about 60 MPH (about 52 kt), and as the aircraft was stable during the approach without being driven by the wind, the pilot made a normal flare operation and the aircraft landed at 14:10.

After the aircraft touched down, the pilot kept the elevators fully up by pulling back the control stick to its rearmost position while keeping the ailerons in neutral and did not apply the brakes with the engine power at idle, allowing the aircraft to coast. As the aircraft began to veer to the left during the landing roll, the pilot applied the right rudder pedal to correct the direction and allowed the aircraft to continue rolling down. Initially, the pilot was able to maintain the direction of the aircraft with the rudder control, but as the speed decreased, it became impossible for the pilot to correct the deviation to the left, even by depressing the right rudder pedal fully. The aircraft veered greatly to the left, rolled to the right, and with the right-wing tip contacting the runway surface, rolled down to near the left edge of the runway. After that, the aircraft tilted forward slightly, causing the propellers and spinner to contact the runway surface, and came to a stop in a nose over.

Figure 1: The Aircraft in Nose Over

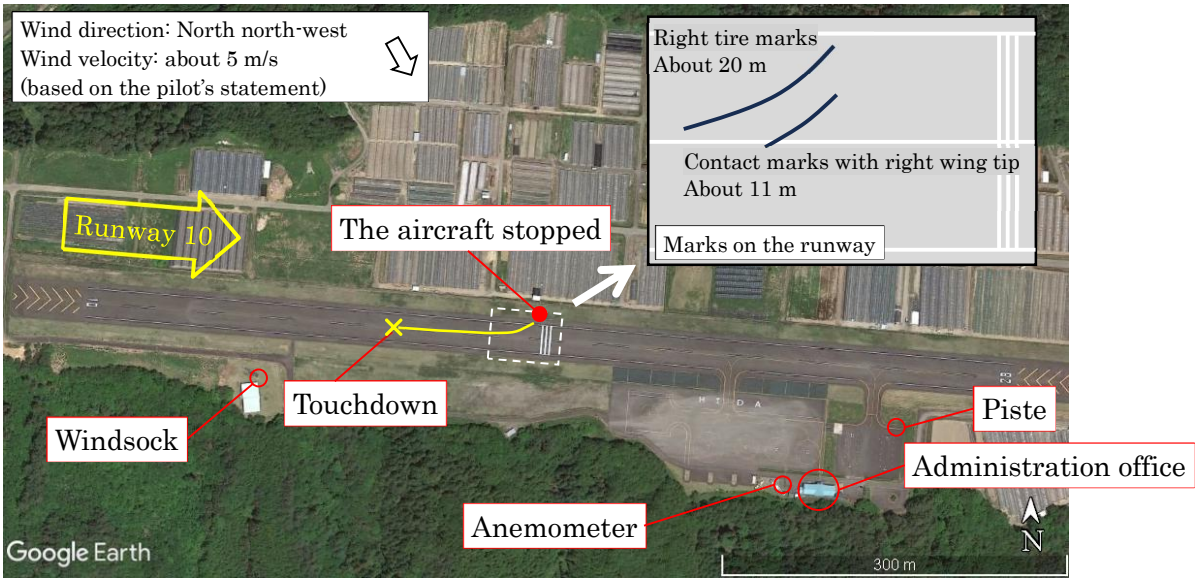

Figure 2: Estimated Landing Roll Route

The aircraft sustained the scratch marks to the right wing tip and damage to the propeller blades (two) and the spinner, but the pilot did not sustain any injury.

(2) Information on the Aircraft's Structure and Ground Roll

The aircraft is a small airplane with a width of 10.83 m, a length of 6.89 m and a maximum gross weight of 1,800 lb (about 820 kg), designed with tailwheel landing gear configurations where a steering system (hereinafter referred to as "the steering") rotates the tailwheel connected to the rudder by operating the rudder pedals while taxiing.

The airplane with tailwheel type landing gear has a long distance between the main wheel and the vertical tail, the area of side behind the main landing gear is larger than its forward area, therefore any crosswind during ground roll will create the greater weathervane effect, due to which when the airplane tends to head windward pivoting around the main wheel. In addition, as the center of gravity is located behind the main wheel, the tailwheel type airplane has unstable characteristics such as attempting to swing the nose even more when the nose deviates during ground roll, likely resulting in a steep turn, called a ground loop, without proper directional control using the rudder and steering.

Besides, when the horizontal tail of a tailwheel-type airplane is exposed to a headwind during ground roll, keeping the elevators in the UP position produces a downward force on the horizontal tail that prevents the tail from lifting and helps to hold the tailwheel down on the runway surface, thus improving steering effectiveness.

(3) Meteorological Characteristic of the Operation Site

As shown in Figure 3, the Operation Site is located on a hilly ridge, and according to the pilot, the wind direction and velocity could vary depending on the location, even on the runway.

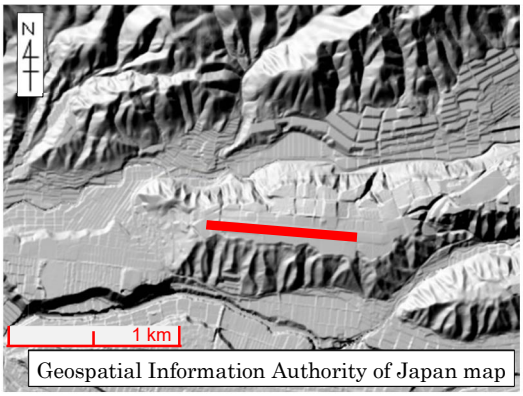

Figure 3: Location of the Operation Site

(4) Flight Support

From the morning on the day of the serious incident, based at the Operation Site, the gliding club was conducting flight training, therefore, the pilot repeatedly made a towing flight to support the training. During the training, the Piste was in control of the

aircraft and the glider, providing them with information on wind conditions and others by radio as the situation required.

During the landing, when the serious incident occurred, the Piste did not provide the aircraft with information on wind conditions, as the wind conditions had not changed since the previous flight of the aircraft, and the pilot did not confirm the wind conditions with the Piste by radio.

(5) Information on Wind Direction and Velocity Limitation

The flight manual of the aircraft includes the following descriptions as crosswind limitation.

Demonstrated crosswind velocity is 15 MPH.

(15 MPH= about 6.7 m/s= about 13 kt)

(6) Additional Information

After the serious incident, no failure in the brake and flight control systems of the aircraft was confirmed, no cracks or unevenness in the runway surface were found that would have impeded the aircraft's rolling down.

3. ANALYSIS

The JTSB concludes that it was probable that around the time of the serious incident the wind was blowing from north or north-northwest at a velocity of approximately 10 kt in the vicinity of the runway, and that the aircraft landed with a strong wind from the left rear. It is possible that at this time, the administration office observed the wind exceeding the crosswind limitation of the aircraft, therefore, the stronger wind was blowing around the center of the runway where the aircraft deviated and came to a nose over than the wind near the touchdown point that the pilot had confirmed with the windsock, or that the wind velocity would have increased during landing roll after touchdown.

It is most likely that immediately after the touchdown when the speed was still higher, the aircraft was able to control its attitude aerodynamically through the control surface because of the headwind on the aircraft, and to control the direction of the aircraft by operating rudder pedals and tailwheel. However, it is probable that as the speed decreased, the less the headwind affected the aircraft, the more the control surface's ability to control the attitude was reduced, reduced was the effect by the elevators kept in the UP position that helped to hold the tailwheel down on the runway surface, and steering effectiveness also decreased, making it more difficult to correct the yaw due to the weathervane effect, resulting in the aircraft veering to the left. It is more likely that when the aircraft yawed due to the weathervane effect, a ground loop probably occurred, and the aircraft rolled to the right due to centrifugal force caused by left turn and the crosswind blowing from the left, causing the right wing tip to contact the runway surface.

It is possible that when the aircraft slowed almost to a stop, the horizontal tail, whose left wing was lifted as the aircraft had been rolled to the right, floated due to the crosswind from the left and the aft fuselage was lifted gradually, causing the aircraft to tip forward and to a nose over.

4. PROBABLE CAUSES

The JTSB concludes that the probable cause of this serious incident was that it is probable that due to deceleration, it became difficult for the aircraft to control its direction into the crosswind during landing roll, and as the aircraft yawed due to the weathervane effect, a ground loop occurred and the aircraft veered sharply to the left, but due to centrifugal force and the crosswind, the aircraft rolled to the right, probably causing the right wing tip to contact the runway surface.

It is possible that when the aircraft slowed almost to a stop, the horizontal tail, whose left wing was lifted as the aircraft had been rolled to the right, floated due to the crosswind from the

left and the aft fuselage was lifted gradually, causing the aircraft to tip forward and to a nose over.

5. SAFETY ACTIONS

The small, light and especially tailwheel-type aircraft are susceptible to the effect of the wind conditions during ground roll, it is important for the pilot to carefully judge whether or not to fly by checking the weather information prior to departure and to pay attention to the changes in weather phenomena during flight, as well as to carefully judge whether or not to land, including runway selection, by not only visually confirming the windsock, but also by obtaining weather information from the Piste and others where such cooperation is available.